TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

ANALYZER SET, PHOTOGRAPHIC SURVEILLANCE SYSTEM LS-89A (FSN 6760-462-3041)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
APRIL 1972

WARNING

Be careful when working on the 115-volt, 400-Hz ac line connections. Serious injury or death may result from contact with these terminals.

DON'T TAKE CHANCES!

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *17 November 1977*

Operator's and Organizational Maintenance Manual
Including Repair Parts and Special Tool Lists

ANALYZER SET, PHOTOGRAPHIC SURVEILLANCE SYSTEM
LS-89A
(NSN 6760-00-462-3041)

TM 11-8760-24-12 6 April 1972 is changed as follows:

1. The title of the manual is changed to read as shown above.
2. New or changed material is indicated by a vertical bar in the margin.
3. Remove and insert pages as indicated in the page list below:

Remove	*Insert*
i and ii	i and ii
1-1and 1-2	1-1 and 1-2
B-1 through B-56	B-1 through B-6

4. File this change sheet in the front of the manual for reference purposes.

By Order of the Secretary of the Army:

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Distribution:

To be distributed in accordance with DA Form 1231, Section VI, Organizational 11-series avionics TM literature requirements for the OV-1D aircraft.

TECHNICAL MANUAL

No. 11-6760-245-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *6 April 1972*

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists ANALYZER SET, PHOTOGRAPHIC SURVEILLANCE SYSTEM LS-89A (NSN 6760-00-462-3041)

LIST OF ILLUSTRATIONS

LIST OF TABLES

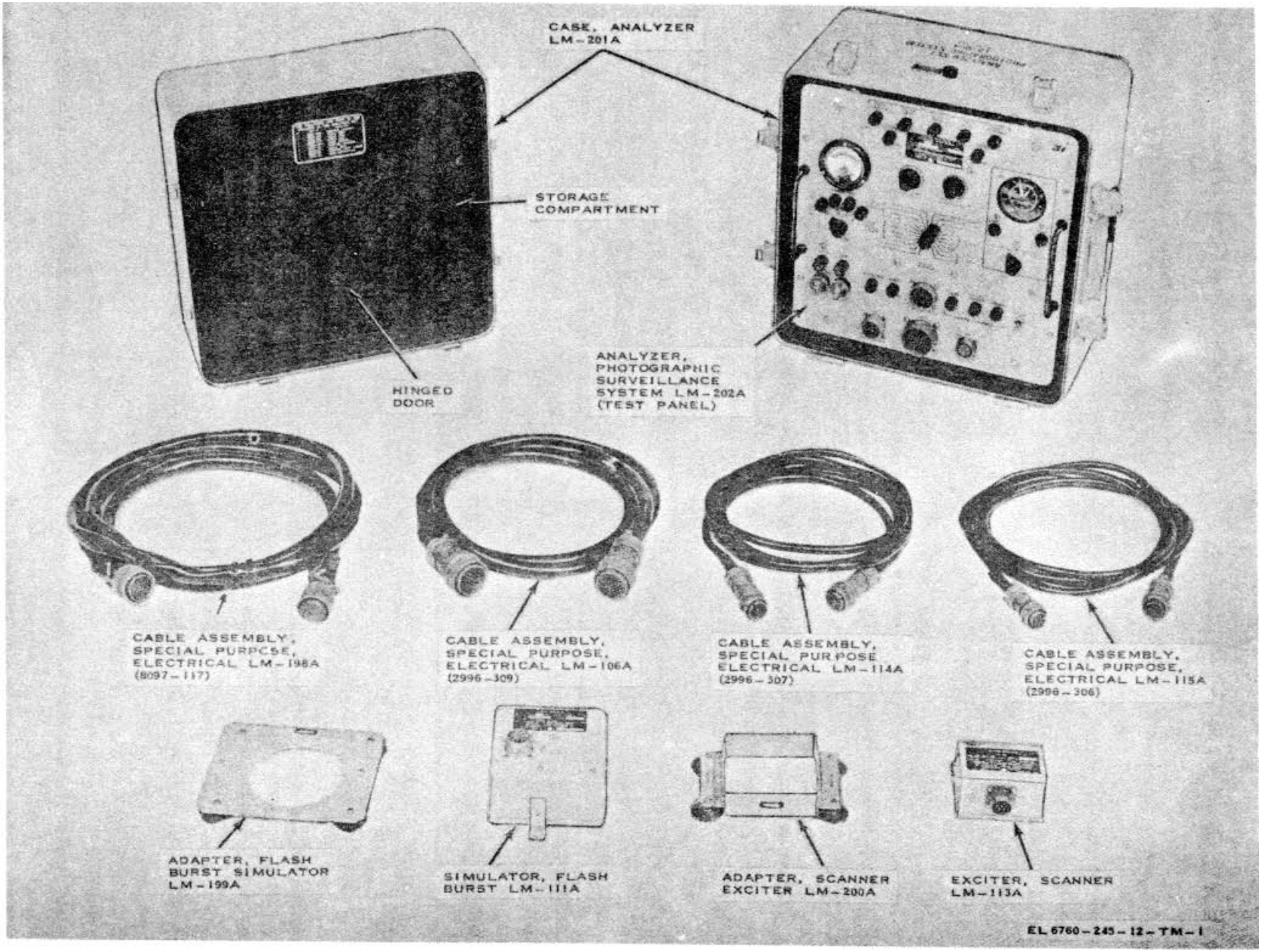

Figure 1-1. Analyzer Set, Photographic Surveillance System LS-39a

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Analyzer Set, Photographic Surveillance System LS89A (fig. 1-1), and provides instructions for installation, operation, and operator's and organizational maintenance. It includes instructions for operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to the operator and organizational maintenance technician.

b. The maintenance allocation chart (MAC) is contained in appendix B; the organizational repair parts list is contained in appendix C.

c. Appendixes B and C are current as of 3 January 1972.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 3104 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 3107 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM38750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 70068/NAVSUPINST 4030.29/AFR 7113/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP, (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 5538/NAVSUPINST 4610.33A/AFR 7518 MCO P4610.19B and DSAR 4500.15.

1-3.1. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommenced Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSELMAQ, Fort Monmouth, New Jersey 07703.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38750, The Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Electronic, Command, ATTN: DRSELMAQ, Fort Monmouth, New Jersey 0770a A reply will be furnished direct to you.

1-4. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740901

1-5. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 7502442

Section II. DESCRIPTION AND DATA

1-6. Purpose and Use.

a. Purpose. Analyzer Set, Photographic Surveillance System LS89A is designed to measure and analyze signal voltages of an aircraft camera control system (ACCS) as installed in an aircraft. It provides the capability of isolating a malfunction down to a replaceable major component of an ACCS.

b. Use. Analyzer Set, Photographic Surveillance System LS89A is used on the flight line to perform preflight operational checks on the following aircraft control camera systems: Photographic Surveillance System, Airborne KS104A; Photographic Surveillance System, Airborne KS104B; and Photographic Surveillance System, Airborne KS113A. It enables the opera-

tor to select, route, and measure output signal voltages of an ACCS being tested. After the nature and extent of the system malfunction have been determined, the organizational repairman replaces (if necessary) the faulty component of the ACCS and repeats the operational preflight checkout to assure that the equipment is functioning properly.

1-7. Technical Characteristics

Power requirements:
- Ac ..... 115 volts, 400 Hertz, 0.20 ampere.
- Dc ..... 28 volts, 2.6 amperes.

Timer clock:
- Type..... Continuous-running motor, clutch controlled, 280 watts.
- Range 0 to 60 seconds (graduated in increments of 0.01 second and 1 second).

TEST CONDITIONS meter:
- Type ..... D'Arsonval movement, 60-microampere sensitivity.
- Range..... Direct reading in GO or NO-GO graduations.

Scanner circuit flashing rates 10 times per second; 30 times per second.

Temperature range:
- Operating ..... -40° F (-35° C) to +131° F (-55° C).
- Storage..... -85° F (--65° C) to +185° F (+85° C).

1-8. Items Comprising Analyzer Set, Photographic Surveillance System LS-89A (fig. 1-1)

The items in table 1-1 make up an operable Analyzer Set, Photographic Surveillance System LS-89A. This listing is based on the original shipment by the contractor under Government contract DAAB05-67-C-3302.

Table 1-1. Items Comprising Analyzer Set, Photographic Surveillance System LS-89A

FSN	Item	Quantity	Dimensions (in.) Height	Depth	Width	Weight (lb)
6760-462-3041	Analyzer Set, Photographic Surveillance System LS-89A consisting of:					
6760-462-3053	Analyzer, Photographic Surveillance System LM-202A.	1	14	10	14	15.0
6760-457-0584	Case, Analyzer LM-201A	1	16	17	18	23.0
6760-874-4556	Exciter, Scanner LM-113A	1	2 ¼	3 3/8	4 ¼	0.44
6750-462-3046	Adapter, Scanner Exciter LM-200A	1	1 ½	4 ¼	7	0.25
6760-874-4553	Simulator, Flash Burst LM-111A .	1	3 ¾	5 1/8	6 ¾	1.31
6760-462-3043	Adapter, Flash Burst Simulator LM-199A 0.25	1	¾	6	7	0.25
6760-740-0697	Cable Assembly, Special Purpose, Electrical LM-115A.	1	12 (ft lg)			1.38
6760-740-4698	Cable Assembly, Special Purpose, Electrical LM-114A.	1	12 (ft lg)			1.88
6760-855-9292	Cable Assembly, Special Purpose, Electrical LM-106A.	1	8 (ft lg)			3.0
6760-462-3042	Cable Assembly, Special Purpose, Electrical LM-198A.	1	12 (ft lg)			2.50

1-9. Common Names

Common names have been assigned to the items listed in table 1-2.

Table 1-2. Common Names

Common name	*Nomenclature*
System analyzer	Analyzer Set, Photographic Surveillance System, LS-89A.
Combination case	Case, Analyzer LM-201A.
Test panel	Analyzer, Photographic Surveillance System LM-202A.
Scanner exciter	Exciter, Scanner LM-113A.
Scanner exciter adapter	Adapter, Scanner Exciter LM-200A.
Light source	Simulator, Flash Burst Simulator LM-111A.
Light source adapter	Adapter, Flash Burst Simulator LM-199A.
Cable 2996-306 (A1W1)	Cable Assembly, Special Purpose, Electrical LM-115A.
Cable 2996-307 (A1W2)	Cable Assembly, Special Purpose, Electrical LM-114A.
Cable 2996-309 (A1W4)	Cable Assembly, Special Purpose, Electrical LM-106A.
Cable 8097-117 (A1W3)	Cable Assembly, Special Purpose, Electrical LM-198A.
ACCS	Aircraft Camera Control System.

1-10. Description of System Analyzer
(figs. 1-1 through 1-3)

The system analyzer consists of a combination case (a below), a test panel (b below), a scanner exciter (c below), scanner exciter adapter (d below), a light source (e below), light source adapter (f below), and four cables (g through j below).

a. Combination Case. The two-part combination case (fig. 1-1) is joined by two separate hinges along one side. Snap latches are provided for securing the case top to the case bottom. An air relief valve, located on the side opposite the hinged side, provides for sealing the case against humidity and dust, and permits equalization of air pressure inside and outside the case before it is opened. The test panel is shock-mounted in the combination case bottom. The top section of the case contains a cushioned storage compartment for storing the scanner exciter, scanner exciter adapter, light source, light source adapter, and four cables when these items are not in use. Two folding handles on the bottom case permit hand-carrying the system analyzer.

b. Test Panel. The test panel (fig. 1-1) is a transistorized unit designed to measure and analyze signal voltages from an ACCS as installed in the aircraft. All the controls, indicators, connectors, and meters required to perform the operational tests are mounted on the front of the test panel. MASTER SELECTOR switch, used in conjunction with sectionalized controls, indicators, and connectors, checks out the various circuits of the ACCS. Primary power to operate the system analyzer is furnished by the ACCS being tested through SYSTEM TEST connector J5. When used with Simulator, Control System, Camera LS36A, power is furnished through LS36 connector J1.

c. Scanner Exciter (fig. 1-2). The scanner exciter is a flashing light source which provides alternating light signals controlled from the system analyzer to test the response of the scanner in the ACCS under test. It contains two lights and a photocell inclosed in a metal case. A connector is mounted on one side of the metal case which provides the connection to the test panel SCANNER EXCITER connector. On the other side of the metal case are two translucent windows which transmit the flashing light sources.

d. Scanner Exciter Adapter (fig. 1-2). The scanner exciter adapter consists of a metal frame with four suction cups. The metal frame is used to secure the scanner exciter to the metal frame by means of a springloaded latch, and a flange and slot arrangement. The suction cups permit securing the entire assembly to the skin of the aircraft.

e. Light Source (fig. 1-3). The light source is a metal assembly which simulates a flash burst to test the flash detector in the ACCS. The light source consists of a photocell, two lamps, and a fan motor, all contained in a metal case. The metal case has a connector which provides the connection to the test panel LIGHT DETECTOR LIGHT SOURCE connector. On the other side of the metal case is a translucent window which transmits the light to the ACCS sensor. The metal case has three vent holes and two Dzus fasteners

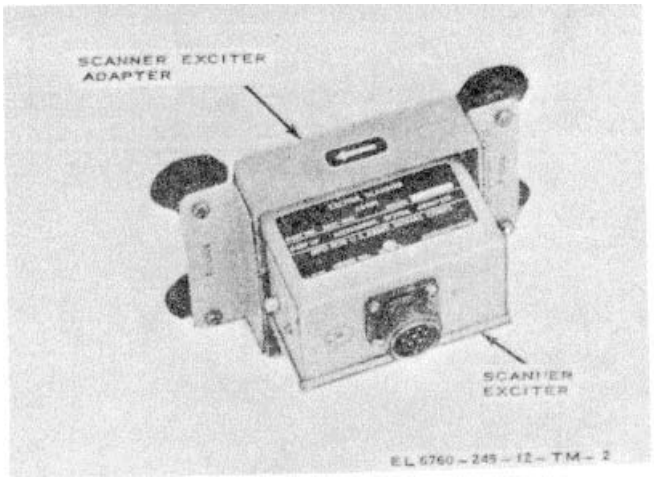

Figure 1-2. Scanner exciter and scanner exciter adapter.

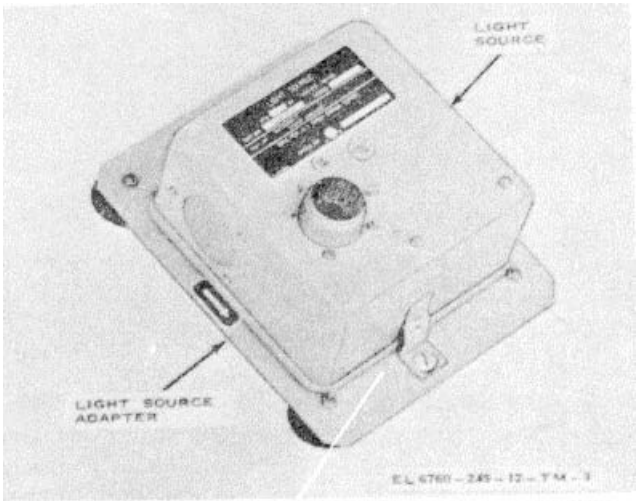

Figure 1-3. Light source and light source adapter.

mounted on flanges to permit securing the light source to the light source adapter.

f. Light Source Adapter (fig. 1-3). The light source adapter consists of a metal plate with four suction cups and a 4-inch diameter hole. The light source translucent window is aligned with the 4-inch hole in the adapter and secured with the two Dzus fasteners. The suction cups permit securing the entire assembly to the skin of the aircraft.

g. Cable 2996--06 (AIW1). Cable 2996-306 (ALW1) is a seven-conductor cable. One end of the cable is terminated by a seven-prong male connector which mates with SCANNER EXCITER connector J3 on the test panel. The other end of the cable is terminated by a seven-pin female connector which mates with connector J1 on the scanner exciter.

h. Cable 2996-307 (AIW2). Cable 2996-307 (A1W2) is an eight-conductor cable. One end of the cable is terminated by an eight-prong male connector which mates with LIGHT DETECTOR LIGHT SOURCE connector J4 on the test panel. The other end of the cable is terminated by an eight-pin female connector which mates with connector J1 on the light source.

i. Cable 2996-309 (AIW4). Cable 2996-309 (A1W4) is a 29-conductor cable. One end of the cable is terminated by a 37-pin female connector which mates with LS-36A connector J1 on the test panel. The other end of the cable is terminated by a 37-prong male connector which mates with connector J701 on Simulator, Control System, Camera LS-36A.

j. Cable 8097-117 (AIWS). Cable 8097-117 (A1W3) is a 37-conductor cable. One end of the cable is terminated by a 55-pin female connector which mates with SYSTEM TEST connector J5 on the test panel. The other end of the cable is terminated by a 55-prong male connector which mates with connector J3 on Control, Power Supply LA-406A.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. Unpacking
(fig. 2-1)

a. Packaging and Packing Data. When packed for shipment, the components of the system analyzer are secured in the combination case and packed in a corrugated carton. A typical corrugated carton and its contents are shown in figure 2-1. A corrugated carton is 24 inches high by 23 inches wide by 24 inches deep. The total weight is 56.5 pounds and the volume is 8.0 cubic feet.

b. Unpacking.

CAUTION

When opening the corrugated carton, take care not to cut or scratch the surface of the combination case.

(1) Carefully cut the gummed tape at the top of the corrugated carton and fold back the flaps.

(2) Remove top rubberized horsehair pad.

(3) Remove the system analyzer from the corrugated carton.

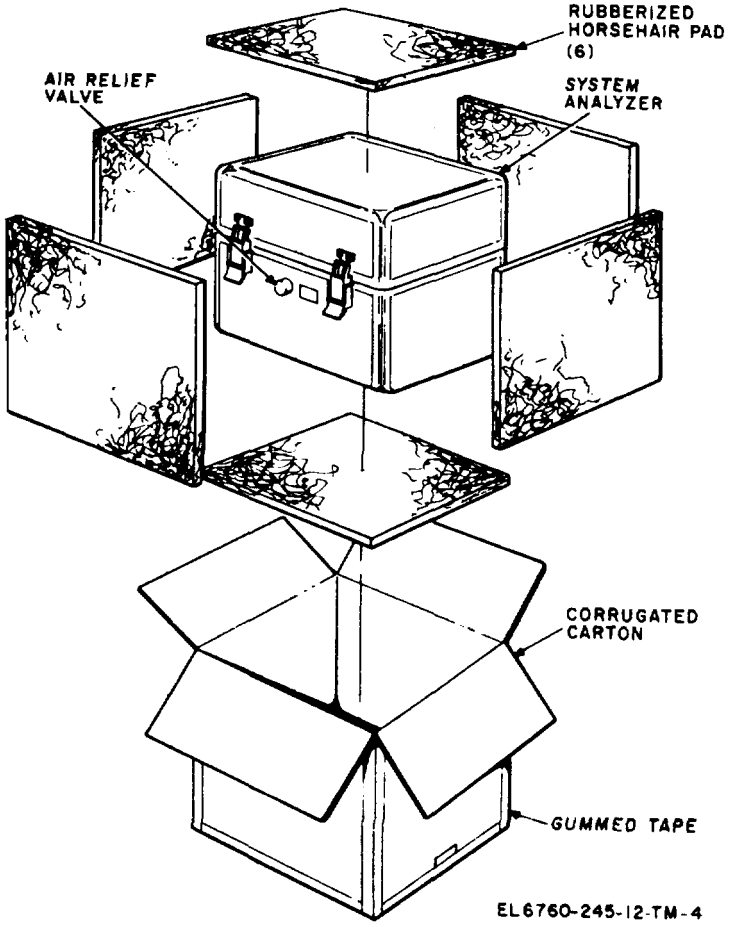

Figure 2-1. System analyzer, typical packaging diagram.

(4) Cut and remove the lock wire from the air relief valve (fig. 2-1); turn the air relief valve counterclockwise.

(5) Unfasten the snap latches. Lift the combination case top and slide it to the right to disengage the separable hinges.

(6) Remove the waterproof package containing the instruction manuals from the pocket on hinged door. Cut the tape securing one side of the waterproof package and remove the instruction manuals.

(7) Open the hinged door by rotating the two twistlock fasteners counterclockwise until the latches release the hinged door.

(8) Remove the components from the compartment cushions.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment.

(1) Check all painted surfaces for scratches, nicks, dents, and fractures.

(2) Check the combination case for bent or broken snap latches, damaged separable hinges, and a defective air relief valve.

(3) Check to see that the pins on the test panel connectors and cable connectors are not damaged.

(4) Check for cracked or broken indicator lamp jewels, or lenses, and bent switch levers, or broken control knobs.

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, use the listing contained in paragraph 1-8. Report all discrepancies in accordance with TM 38750 (para 1-3). Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. If modified, see that any operational instruction changes resulting from the modification has been entered in the equipment manual.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 3107.

2-3. Seating of Fuses

CAUTION

Use only fuses of the correct value when replacing a fuse. Oversize fuses can result in damage to the equipment.

NOTE

The test panel of the system analyzer is shipped with its fuses installed.

a. See that the ¼-ampere, 115 volt fuses are installed in their fuse holders: one in the 1/4 AMP AC fuse holder; the other in the AC SPARE fuse holder.

b. See that the 4ampere, 28volt fuses are installed in their fuse holders: one in the 4 AMP DC fuse holder; the other in the DC SPARE fuse holder.

Section II. OPERATOR'S CONTROLS, INDICATORS, AND CONNECTORS

2-4. ACCS Components and Common Names

The system analyzer isolates malfunctions down to one of the major components of the ACCS listed in the chart below. These components are also identified by common names. The assigned common names shall be referenced throughout the remainder of this chapter.

Table 2-1. ACCS Components and Common Names

Nomenclature	*Common name*
Control, Power Supply LA-406A.	Photo system assembly.
Actuator Assembly, Rotary Mount Positioning LA-409A.	Rotary mount actuator.
Control Master, Aircraft Camera LA-405A (KS-104A camera system only).	Photo control panel.
Control Master, Aircraft Camera LA-405B (KS-104B camera system only).	Photo control panel.
Control Master, Aircraft Camera LA-432A (KS-113A camera system only).	Photo control panel.
Control, Height-Ground Speed Ratio C-8340/A (KS-113A camera system only).	Manual V/H control panel.
Camera, Still Picture KA-76A.	Camera.
Actuator-Electro-MECH, Linear (134SCAV104-1). (This item is part of the aircraft configuration and is used with the ACCS.)	Door actuator.

2-5. Test Panel Controls, Indicators, and Connectors

(fig. 2-2)

Table 2-2. Test Panel Controls and Indicators

Control or indicator	Function
Test panel section:	Two-position goggle switch:
POWER switch	*Position* — *Function* OFF — Disconnects power to test panel. ON — Applies power to test panel.
AC ¼ AMP fuse holder lamp	Lights when AC fuse is blown.
DC 4 AMP fuse holder lamp	Lights when DC fuse is blown.
INTERLOCK DOOR indicator	Lights when doors open interlock ground is received by photo system assembly.
READY MOUNT indicator	Lights when mount ready ground is applied to photo system assembly.
FOCAL LENGTH selector switch	Four-position rotary switch: *Position* — *Function* 44MM — Sets up test panel to check feedback voltages of ACCS containing camera with 44MM lens cone. 3” — Sets up test panel to check tach feedback voltages of ACCS containing camera with 3-inch lens cone. 6" — Sets up test panel to check tach feedback voltages of ACCS containing camera with 6-inch lens cone. 12" — Sets up test panel to check tach feedback voltages of ACCS containing camera with 12-inch lens cone.
MASTER SELECTOR switch	Twenty-two position rotary switch: *Position* — *Function* LIGHT LEVEL CAL — Sets up test panel to calibrate light source. SCAN EXC CAL — Sets up test panel to calibrate scanner exciter. SYS INPUT POWER 28VDC — Sets up TEST CONDITIONS meter to check ACCS 28 vdc power. SYS INPUT POWER PHASE A — Sets up TEST CONDITIONS meter to check 115 vac, 400-Hz, PH A, ACCS power. SYS INPUT POWER PHASE B — Sets up TEST CONDITIONS meter to check 115 vac, 400-Hz, PH B, ACCS power. SYS INPUT POWER MOUNT AC — Sets up TEST CONDITIONS meter to check mount 115 vac, 400-Hz, ACCS power. SYS INPUT POWER DOOR DC — Sets up TEST CONDITIONS meter to check that doors open input power is received by the photo system assembly. SYS OUTPUT POWER FLASHER DC — Sets up TEST CONDITIONS meter to check flasher + 28 vdc output from photo system assembly for night mode operation. SYS OUTPUT POWER FLASHER AC — Sets up TEST CONDITIONS meter to check flasher LS-59A, 115 vac, 400-Hz output from photo system assembly for night mode operation. SYS OUTPUT POWER SCANNER AC — Sets up TEST CONDITIONS meter to check scanner 115 vac, 400-Hz, PH A output from photo system assembly.

Control or Indicator	Function
	Position — *Function* SYS OUTPUT POWER DOOR DC — Sets up TEST CONDITIONS meter to check that doors open +28 vdc output from the photo system assembly. FLASHER READY — Sets up TEST CONDITIONS meter to check flasher ready +28 vdc input voltage applied to photo system assembly. CAMERA INTLK — Sets up TEST CONDITIONS meter to check camera + 28 vdc interlock input voltage applied to photo system assembly. MOUNT POS SIG — Sets up TEST CONDITIONS meter to check mount position signal from mount assembly. E V/H L — Sets up TEST CONDITIONS meter to check low V/H voltage (system-flasher E V/H) from scanner converter (auto) or photo control panel. L TACH 90° — Sets up TEST CONDITIONS meter to check tach output (-tach) from camera in 90° position for low V/H voltage. L TACH 30° — Sets up TEST CONDITIONS meter to check low tach output (-tach) from camera in 30° position for low V/H voltage. L TACH 15° — Sets up TEST CONDITIONS meter to check low tach output (-tach) from camera in 15° position for low V/H voltage. E V/H H — Sets up TEST CONDITIONS meter to check high V/H voltage (system-flasher E V/H) of scanner converter (auto) or photo control panel. H TACH 90° — Sets up TEST CONDITIONS meter to check tach output (-tach) from camera in 90° position for high V/H voltage. H TACH 30° — Sets up TEST CONDITIONS meter to check tach output (-tach) from camera in 30° position for high V/H voltage. H TACH 15° — Sets up TEST CONDITIONS meter to check tach output (-tach) from camera in 15° position for high V,/Fe Voltage.
SCAN EXC CALIBRATE control	Potentiometer; used to adjust light level (intensity) output of scanner.
LIGHT LEVEL CALIBRATE control	Potentiometer; used to adjust light level (intensity) output of light source.
TEST CONDITIONS meter	Indicates GO or NO-GO conditions for various ACCS signals as selected on MASTER SELECTOR switch.
FOCAL LENGTH 44MM indicator	Lights when 44MM lens cone (1 ¾ -inch lens cone) is used with camera.
FOCAL LENGTH 3” indicator	Lights when 3-inch lens cone is used with camera.
FOCAL LENGTH 6 indicator	Lights when 6-inch lens cone is used with camera.
FOCAL LENGTH 12” indicator	Lights when 12-inch lens cone is used with camera.
MASTER	CONTROL section:
MODE indicator	Lights when night mode or pulse mode ground is applied to photo system assembly.
MOUNT OBLIQUE indicator	Lights when ACCS mount switch is 15° left, 30° left, 15° right, or 30° right ground is applied to photo system assembly.
OPERATE indicator	Lights when operate ground is applied to photo system assembly.

Control or indicator	Function
PHOTO SYSTEM section:	
OPERATE CAMERA indicator	Lights when camera failure voltage is received from camera through photo system assembly. Also flashes once for each camera cycle in normal operation.
READY INDICATE indicator	Lights when photo system assembly applies ready indicate voltage to camera.
MOTOR DRIVE indicator	Lights when both the positive and negative drive motor voltages are present in photo system assembly.
CYCLE PULSE indicator	Flashes with every cycle pulse received from photo system assembly.
IMC MODE indicator	Lights when master control applies ground to camera for pulse/IMC mode.
NIGHT EXPOSURE indicator	Lights to indicate that photo system assembly is applying ground to camera night exposure increase circuit.
FLASH CAMERA indicator	Flashes once for each camera cycle when camera flash trigger circuitry is operative (night mode operation only).
TIMER section:	
Mode selector switch	Three-position rotary switch:
OFF	Disconnects IMC PULSE and CYCLE PULSE from timer stepping switch.
IMC PULSE	Permits IMC pulses to trigger time stepping switch after timer start switch has been depressed.
CYCLE PULSE	Permits the photo system assembly cycle pulses to trigger timer stepping switch when timer start switch has been depressed.
START switch	Pushbutton switch: Permits timer stepping switch to receive IMC or cycle pulses and to start timer clock.
RESET switch	Pushbutton switch: Resets TIMER clock to zero when pressed.
Timer (clock)	Indicates elapsed time of five IMC or cycle pulse intervals in seconds and 1/100 of a second (up to 60 seconds). *Note*. Two concentric dials are used on TIMER clock. The dial with long hand covers 1/100-second increments and dial with the short hand covers 1-second increments. When clock is reset, long hand returns to 100 and short hand returns to 60.

Table 2-3. Test Panel Connectors

Connector	Function
LS-36A connector J1	37-prong male connector; provides connection from test panel to Simulator, Control System, Camera LS-36A so that TIMER clock may be used independently for camera timing purposes.
SCANNER EXCITER connector J3	7-pin female connector; provides connection from test panel to scanner exciter.
LIGHT DETECTOR LIGHT SOURCE connector J4	8-pin female connector; provides connection from test panel to light source.
SYSTEM TEST connector JB	55-prong male connector; provides connection from test panel to the photo system assembly.

2-6. System Analyzer Cables

(fig 1-1)

Table 2-4. System Analyzer Cables

Cable	Function
Cable 2296-306 (A1W1)	Connects test panel SCANNER EXCITER connector J3 to scanner exciter connector J1.
Cable 2996-307 (A1W2)	Connects test panel LIGHT DETECTOR LIGHT SOURCE connector J4 to light source connector J1.
Cable 2996-309 (A1W4)	Connects test panel LS-36A connector J1 to Simulator, Control System, Camera LS-36A connector J701.
Cable 8097-117 (A1W3)	Connects test panel SYSTEM TEST connector J5 to LA-406A connector J3.

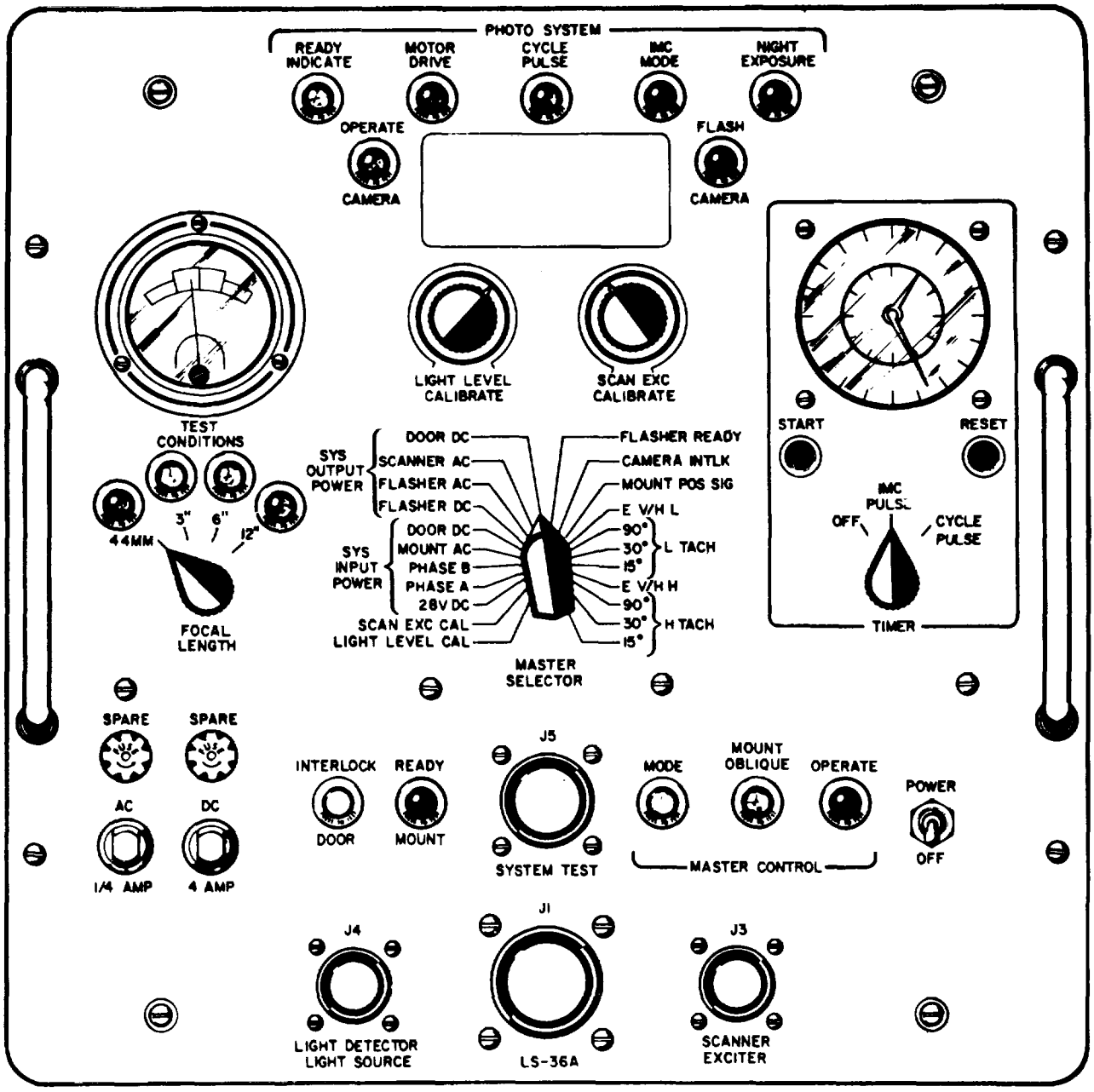

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Figure 2-2. Test panel controls, indicators, and connectors.

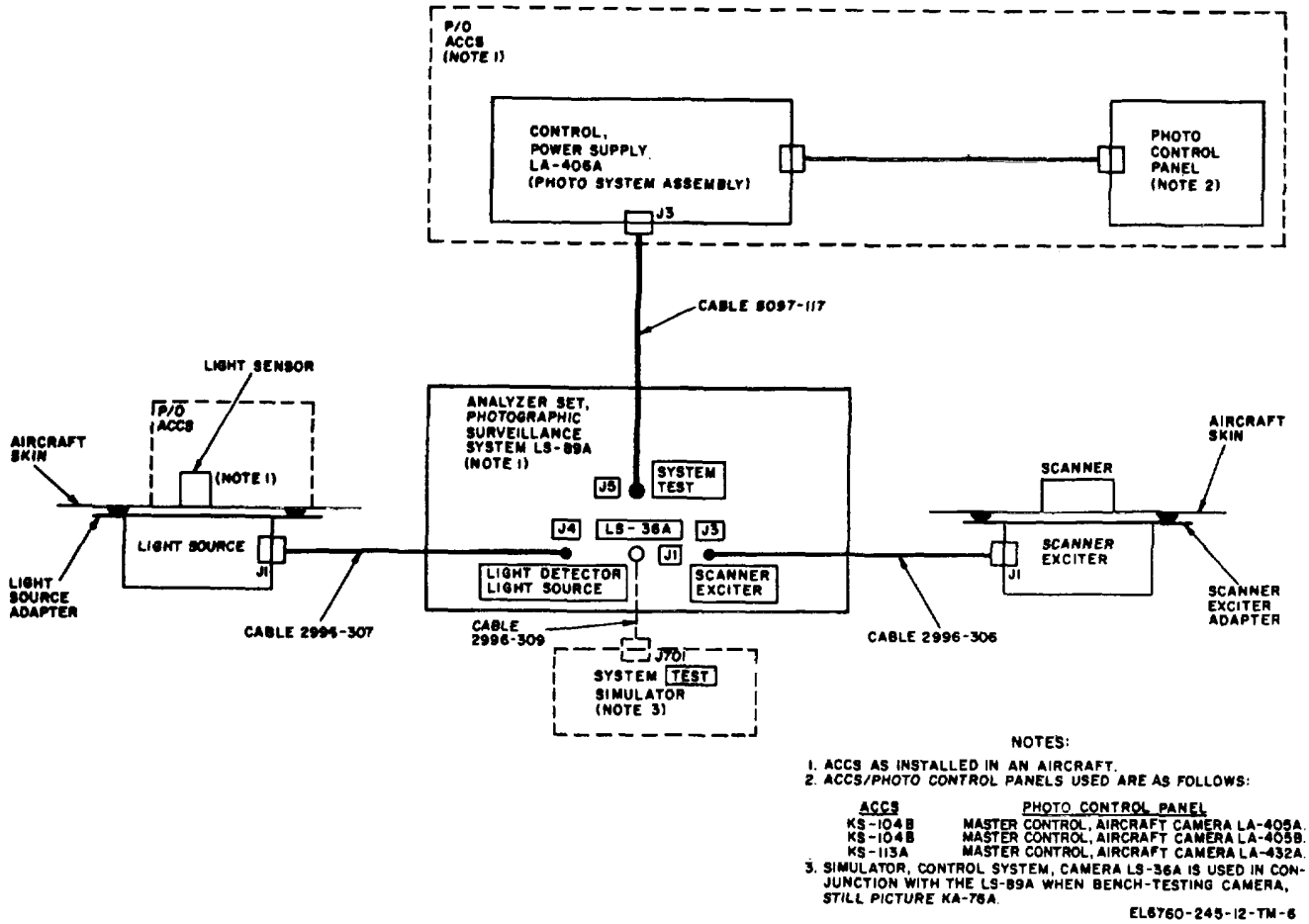

Figure 2-3. System analyzer internal check, test setup.

Section III. OPERATION UNDER USUAL CONDITIONS

2-7. Types of Operation

a. The system analyzer is used on the flight line to perform preflight operational checks on the following camera systems: Photographic Surveillance System, Airborne KS104A; Photographic Surveillance System, Airborne KS104B; and Photographic Surveillance System, Airborne KS113A. The types of operation, using the system analyzer when checking the KS104A and KS104B are identical. These operating procedures are covered in this manual. The system analyzer operating procedures for checking the KS113A are different and are contained in the KS113A equipment manual (TM 11-6720-250-12).

b. The system analyzer is also used on the bench when checking Camera, Still Picture KA76A. It is used in conjunction with Simulator, Control System, Camera LS36A and Adapter, Test Camera LM178A (part of Test Set, Analyzer, Camera LS80A). The LS36A simulates an ACCS when testing the KA76A. The system analyzer provides the measurement for the camera cycle pulses. Refer to TM 11-6720-236-35 for instructions on the use of the system analyzer when checking out the KA76A.

2-8. Preliminary Procedures

NOTE

Before performing the following procedure, be sure that all switches and controls on the test panel are set to off or extreme counterclockwise positions.

a. Mount the scanner exciter to the scanner exciter adapter and the light source to the light source adapter.

b. Connect cable 8097117 between photo system assembly connector J3 and test panel SYSTEM TEST connector J5.

c. Connect cable 2996306 between test panel SCANNER EXCITER connector J8 and J1 on the scanner exciter.

d. Connect cable 2996307 between test panel LIGHT DETECTOR LIGHT SOURCE connector J4 and J1 on the light source.

e. Mount the light source and scanner exciter to the aircraft as shown in figure 2-3.

f. Set the test panel FOCAL LENGTH switch to correspond to the lens cone being used in the ACCS.

g. Set the ACCS photo control panel SYS PWR switch to READY.

NOTE

The ACCS photo control panels used are as follows:

ACCS	*Photo control panel*
KS104A	Master Control, Aircraft Camera LA405A
KS104B	Master Control, Aircraft Camera LA405B
KS118A	Master Control, Aircraft Camera LA42A

h. Connect external power to the aircraft.

NOTE

Refer to the applicable aircraft configuration technical manual for instructions on applying external power to the aircraft.

i. Set the test panel POWER switch to on.

NOTE

AC and DC fuse holder indicators light only when power is present and their respective fuses are blown.

j. Set the test panel MASTER SELECTOR switch to SYS INPUT POWER 28 vdc. The TEST CONDITIONS meter indicates in the GO area.

k. Set the test panel MASTER SELECTOR switch to SYS INPUT POWER PHASE A. The TEST CONDITIONS meter indicates in the GO area

l. Set the test panel MASTER SELECTOR switch to SYS INPUT POWER PHASE B. The TEST CONDITIONS meter indicates in the GO area.

m. Press all PRESS TO TEST indicators on the test panel. Each indicator lights when pressed.

2-9. KS104A or KS104B Preflight Operational Check

NOTES

1. Make sure the procedures given in paragraph 2-8 are performed prior to performing the following procedures.
2. The following procedures are a preflight operational check for the KS104A and KS104B camera systems. The procedures should be followed in sequential order. The results and/or indications are given in the *Result/indication* column. The last column in the chart gives the probable source of failure for each abnormal indication. Refer to the applicable aircraft configuration manuals for replacement procedures of these components.

Table 2-5. KS-104A or KS-104B Preflight Operational Check

Step	Procedure	Result/indication	Source of failure If indication is abnormal
1	*Photo control panel* *a.* Set SYS PWR to READY. *b.* Set MOUNT selector to 90a. *c.* Set MODE selector to PULSE IMC. *d.* Set V/H switch to MANUAL.		
2	*LS-89A* Set MASTER SELECTOR to LIGHT LEVEL CAL	*Note.* If necessary adjust LS-89A LIGHT LEVEL CALIBRATE knob until TEST CONDITIONS meter indicates in the CAL area. *a.* TEST CONDITIONS meter indicates in CAL area. *b.* Green MOTOR DRIVE indicator lights- *c.* IMC MODE indicator lights	 *a.* Light source. *b.* Camera. *c.* Camera.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
		d. Appropriate green FOCAL LENGTH indicator for lens cone in use lights.	*d.* Door actuator.
		e. Green INTERLOCK DOOR indicator lights	*e.* Rotary mount actuator.
		f. Green READY MOUNT indicator lights-	*f.* Photo control panel.
		g. Green MODE indicator lights	*g.* None.
3	*LS-89A* Set MASTER SELECTOR to SCAN EXC CAL.	Same as step 2	Same as step 2 except check scanner exciter if TEST CONDITIONS meter indication is abnormal.
4	*LS-89A* Set MASTER SELECTOR to SYS INPUT POWER 28 VDC.	*a.* TEST CONDITIONS meter indicates in GO area.	*a.* Photo system assembly.
		b. Green MOTOR DRIVE indicator lights	*b.* Camera.
		c. IMC MODE indicator lights	*c.* Camera.
		d. Appropriate green FOCAL LENGTH indicator for lens in use lights.	*d.* Door actuator.
		e. Green INTERLOCK DOOR indicator lights	*e.* Rotary mount actuator.
		f. Green READY MOUNT indicator lights	*f.* Photo control panel.
		g. Green MODE indicator lights	*g.* None.
5	*LS-89A* Set MASTER SELECTOR to SYS INPUT POWER PHASE A.	Same as step 4	Same as step4.
6	*LS-89A* Set MASTER SELECTOR to SYS INPUT POWER PHASE B.	Same as step 4	Same as step 4.
7	*LS-89A* Set MASTER SELECTOR to SYS INPUT POWER MOUNT AC.	Same as step 4	Same as step 4.
8	*LS-89A* Set MASTER SELECTOR to SYS INPUT POWER DOOR DC.	Same as step 4	Same as step 4.
9	*Photo control panel* Set SYS PWR switch to OFF. Set MODE switch to NIGHT. Set SYS PWR switch to READY.		
10	*LS-89A* Set MASTER SELECTOR to SYS OUTPUT POWER FLASHER DC.	*a.* TEST CONDITIONS meter indicates in GO area.	*a.* Photo system assembly.
		b. Green MOTOR DRIVE indicator lights	*b.* Camera.
		c. Green NIGHT EXPOSURE indicator lights	*c.* Photo system assembly.
		d. Appropriate green FOCAL LENGTH indicator for lens in use lights.	*d.* Camera.
		e. Green INTERLOCK DOOR indicator lights	*e.* Door actuator.
		f. Green READY MOUNT indicator lights	*f.* Rotary mount actuator.
		g. Green MODE indicator lights	*g.* Photo control panel.
11	*LS-89A* Set MASTER SELECTOR to SYS OUTPUT POWER FLASHER AC.	Same as step 10.	Same as step 10.
12	*LS-89A* Set MASTER SELECTOR to SYS OUTPUT POWER SCANNER AC.	Same as step 10 .	Same as step 10.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
13	*LS-89A* Set MASTER SELECTOR to SYS OUTPUT POWER DOOR DC.	Same as step 10	Same as step 10.
14	*LS-8DA* Set MASTER SELECTOR to FLASHER READY.	Same as step 10	Same as step 10.
15	*LS-89A* Set MASTER SELECTOR to CAMERA INTLK.	Same as step 10	Same as step 10.
16	*LS-89A* Set MASTER SELECTOR to MOUNT POS SIG.	Same as step 10	Same as step 10.
17	*Photo control panel* Set MOUNT selector to 30° L	*LS-89A* *a.* TEST CONDITIONS meter indicates in GO area. *b.* Green MOTOR DRIVE indicator lights *c.* Green NIGHT EXPOSURE indicator lights *d.* Appropriate green FOCAL LENGTH indicator for lens in use lights. *e.* Green INTERLOCK DOOR indicator lights *f.* Green READY MOUNT indicator lights *g.* Green MODE indicator lights *h.* Green MOUNT OBLIQUE indicator lights	*a.* Rotary mount actuator. *b.* Camera. *c.* Photo system assembly. *d.* Camera. *e.* Door actuator. *f.* Rotary mount actuator. *g.* Photo control panel. *h.* Photo control panel.
18	*Photo control panel* Set MOUNT selector to 15° L	Same as step 17	Same as step 17.
19	*Photo control panel* Set MOUNT selector to 30° R	Same as step 17	Same as step 17.
20	*Photo control panel* Set MOUNT selector to 15° R	Same as step 17	Same as step 17.
21	*Photo control panel* *a.* Set MOUNT selector to 90°. *b.* Set VELOCITY thumbwheels to 300. *c.* Set ALTITUDE-FEET thumbwheels to 5050.		
22	*LS-89A* Set MASTER SELECTOR to E V/H L.	Same as step 17 except MOUNT OBLIQUE indicator goes off.	Same as step 17.
23	*Photo control panel* Set SYS PWR to OPERATE.		
24	*LS-89A* Set MASTER SELECTOR to L TACH 90°.	*a.* TEST CONDITIONS meter indicates in GO area. *b.* Green MOTOR DRIVE indicator lights *c.* Amber CYCLE PULSE indicator flashes every camera cycle. *d.* Green NIGHT EXPOSURE indicator lights *e.* Amber OPERATE CAMERA indicator flashes every camera cycle. *f.* Amber FLASH CAMERA indicator flashes every camera cycle. *g.* Appropriate green FOCAL LENGTH indicator for lens in use lights. *h.* Green INTERLOCK DOOR indicator lights *i.* Green READY MOUNT indicator lights *j.* Green MODE indicator lights	*a.* Camera. *b.* Camera. *c.* Photo system assembly. *d.* Photo system assembly. *e.* Camera. *f.* Camera. *g.* Camera. *h.* Door actuator. *i.* Rotary mount actuator. *j.* Photo control panel.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
		k. Green OPERATE indicator lights	*k.* Photo control panel.
25	*LS-89A* Set TIMER selector to IMC PULSE, press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START push-button **NOTES** 1. Do not press TIMER RESET pushbutton while timer Is operating. 2. Timer meter will operate for five pulse intervals and then stop. A push Interval is equal to 1/6 of the time indicated by the timer meter.	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA-370A (1% inch) — 46.17 to 66.43 seconds LA-S71A (8 inch) — 27.00 to 83.00 seconds LS-374A (8 inch) — 13.50 to 16.50 seconds LS372A (12 inch) — 6.75 to 8.2i seconds	Photo system assembly.
26	*Photo control panel* Set SYS PWR switch to READY.		
27	*LS-89A* Set MASTER SELECTOR TO L TACH 30°.		
28	*Photo control panel* Set MOUNT selector to R 80°. Set SYS PWR switch to OPERATE	*LS-8-SA* *a.* TEST CONDITIONS meter indicates in GO area. *b.* Green MOTOR DRIVE indicator lights *c.* Amber CYCLE PULSE indicator flashes every camera cycle *d.* Green NIGHT EXPOSURE indicator lights *e.* Amber OPERATE CAMERA indicator flashes every camera cycle. *f.* Amber FLASH CAMERA indicator flashes every camera cycle. *g.* Appropriate green FOCAL LENGTH indicator for lens in use lights. *h.* Green INTERLOCK DOOR indicator lights *i.* Green MODE indicator lights *j.* Green READY MOUNT indicator lights *k.* Green MOUNT OBLIQUE indicator lights *l.* Green OPERATE indicator lights	*a.* Camera. *b.* Camera. *c.* Photo system assembly. *d.* Photo system assembly. *e.* Camera. *f.* Camera. *g.* Camera. *h.* Door actuator. *i* Photo control panel. *j.* Rotary mount actuator. *k.* Photo control panel. *l.* Photo control panel.
29	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton. **NOTES** 1. Do not press TIMER RESET pushbutton while timer b operating. 2. Timer meter will operate for five pule in-terval and then stop. A pulse Interval equal to 1/6 of the time indicated by the TIMER meter	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA-370A (1% inch) — Not applicable. LA-371A (3 inch) — 54.00 to 66.00 seconds LS-374A (6 inch) — 32.04 to 39.16 seconds LS-372A (12 inch — 16.02 to 19.58 seconds	Photo system assembly.
30	*Photo control panel* Set SYS PWR switch to READY.		
31	*LS-89A* Set MASTER SELECTOR to L TACH 15'.		
32	Photo control panel a. Set MOUNT selector to R 15'. b. Set SYS PWR switch to OPER-ATE.	Same as step 28	Same as step 28.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
33	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton. **NOTES** 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse Intervals and then stop. A pulse Interval is equal to 1/5 of the time indicated by the timer meter.	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA-370A (1¾ inch) — Not applicable LA-371A (3 inch — 69.17 to 84.563 seconds LS-374A (6 inch) — 48.15 to 58.86 seconds LS-372A (12 inch) — 24.08 to 29.42 seconds	Photo system assembly.
34	*LS-89A* Set MASTER SELECTOR to E V/H H.		
35	*Photo control panel* Set MOUNT selector to 90° and SYS PWR switch to READY.	Same as step 4 except that OPERATE indicator does not light and TEST CONDITIONS meter indicates NO-GO.	Same as step 4.
36	*Photo control panel* *a.* Set SYS PWR switch to OPERATE. *b.* Set VELOCITY-KNOTS thumbwheels to 400. *c.* Set ALTITUDE-FEET thumbwheels to 2300.		
37	*LS-89A* Set MASTER SELECTOR TO H TACH 90°	Same as step 24 .	Same as step 24.
38	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton. **NOTES** 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse interval is equal to 1/5 of the time indicated by the timer meter.	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA370A (1¾ inch) — 15.39 to 18.81 seconds LA-371A (3 inch) — 9.00 to 11.00 seconds LS-374A (6 inch) — 4.48 to 5.48 seconds LS-372A (12 inch) — 2.22 to 2.72 seconds	Photo system assembly.
39	*Photo control panel* *a.* Set SYS PWR switch to READY - *b.* Set MOUNT selector to L 30°. *c.* Set SYS PWR switch to OPERATE.	Same as step 4	Same as step 4.
40	*LS-89A* Set MASTER SELECTOR to H TACH 30°.	Same as step 4 plus green MOUNT OBLIQUE indicator lights.	Same as step 4.
41	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton. **NOTES** 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse interval is equal to 1/5 of the time indicated by the timer meter.	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA-370A (1¾ inch) — Not applicable LA-371A (3 inch) — 18.00 to 22.00 seconds LS-374A (6 inch) — 10.67 to 13.03 seconds LS-372A (12 inch) — 5.31 to 6.49 seconds	Photo system assembly.
42	*Photo control panel* *a.* Set SYS PWR to READY. *b.* Set MOUNT selector switch to L 15°. *c.* Set SYS PWR to OPERATE.		
43	*LS-89A* Set MASTER SELECTOR to H TACH 15°.	Same as step 40	Same as step 40.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
44	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero time meter), and press TIMER START pushbutton. NOTES 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for file pulse interval and then stop. A pulse Interval is equal to 1/6 of the time indicated by the timer meter.	Timer meter reading for appropriate lens cone is as follows: *Lens cone* — *Tolerance* LA-S70A (1 ¾ inch) — Not applicable LA-S71A (3 inch) — 28.18 to 28.27 seconds LS-374A (6 inch) — 17.01 to 20.79 seconds LS-872A (12 inch) — 8.01 to 9.79 seconds	Photo system assembly.
45	*Photo control panel* Set SYS PWR switch to OFF. Set MODE selector switch to PULSE IMC AND V/H switch to SCAN.	*LS-89A* *a.* TEST CONDITIONS meter indicates in GO area. *b.* Green READY INDICATE indicator lights- *c.* Green MOTOR DRIVE indicator lights *d.* Amber CYCLE PULSE indicator flashes every camera cycle. *e.* Green IMC MODE indicator lights *f.* Amber OPERATE CAMERA indicator flashes every camera cycle. *g.* Appropriate green FOCAL LENGTH indicator for lens cone in use lights. *h.* Green INTERLOCK DOOR indicator lights *i.* Green READY MOUNT indicator lights *j.* Green MOUNT OBLIQUE indicator lights - *k.* Green OPERATE indicator lights	*a.* Photo control panel. *b.* Rotary mount actuator. *c.* Camera. *d.* Camera. *e.* Photo control panel, *f.* Camera. *g.* Camera. *h.* Door actuator. *i.* Rotary mount actuator. *j.* Rotary mount actuator. *k.* Photo control panel.
46	*Photo control panel* *a.* Set SYS PWR switch to READY. *b.* Set MOUNT selector switch to L 80°. *c.* Set SYS PWR switch to OPERATE.		
47	*LS-89A* Set MASTER SELECTOR to H TACH 80°.	Same as step 45	Same as step 45.
48	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton **NOTES** 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pule intervals and then stop. A pulse Interval is equal to 1/5 of the time Indicated by the timer meter.	Same as step 44	Same as step 44.
49	*Photo control panel* *a.* Set SYS PWR switch to READY. *b.* Set MOUNT selector switch to 90°. *c.* Set SYS PWR switch to OPERATE.		
50	*LS-89A* Set MASTER SELECTOR to H TACH 90°.	Same as step 45 except that MOUNT OBLIQUE indicator does not light	Same as step 45.
51	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton.	Same as step 38	Photo system assembly.

Step	Procedure	Result/indication	Source of failure If indication is abnormal
	NOTES 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse interval is equal to 1/5 of the time Indicated by the timer meter.		
52	*LS--89A* Set MASTER SELECTOR to E V/H H.	Same as step 47.	Same as step 47.
53	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton.	Same as step 38	Photo system assembly.
	NOTES 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse Interval is equal to 1/5 of the time indicated by the timer meter.		
54	*Photo control panel* *a.* Set SYS PWR to READY. *b.* Set VELOCITY/ KNOTS thumb-wheels to 300. *c.* Set ALTITUDE/FEET thumb-wheels to 5200. *d.* Set MOUNT selector switch to R 15°.		
55	*LS-89A* Set MASTER SELECTOR in L TACH 15°.	Same as step 45-- .	Same as step 45.
56	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton.	Same as step 33	Photo system assembly.
	NOTES 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse Interval is equal to 1/5 of the time indicated by the timer meter.		
57	*Photo control panel* *a.* Set SYS PWR switch to READY. *b.* Set MOUNT selector to R 30°. *c.* Set SYS PWR switch to OPER-ATE.		
58	*LS-89A* Set MASTER SELECTOR to L TACH 30°.	Same as step 45.	
59	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton.	Same as step 29	Photo system assembly.
	NOTES 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse Interval is equal to 1/5 of the time indicated by the timer meter.		
60	*Photo Control panel* *a* Set SYS PWR switch to READY. *b.* Set MOUNT selector switch to 90°. *c.* Set SYS PWR switch to OPER-ATE.		

Step	Procedure	Result/indication	Source of failure If indication is abnormal
61	LS-89A Set MASTER SELECTOR to L TACH 90°.	Same as step 45	Same as step 45.
62	LS-89A Press TIMER RESET pushbutton (if necessary to zero timer meter), and TIMER START pushbutton. **NOTES** 1. Do not press TIMER RESET pushbutton while timer is operating. 2. Timer meter will operate for five pulse Intervals and then stop. A pulse interval Is equal to 1/S of the time indicated by the timer meter.	Same as step 25	Photo system assembly.
63	*LS-89A* Set MASTER SELECTOR to E V/H L.	Same as step 45	Same as step 45.
64	*LS-89A* Press TIMER RESET pushbutton (if necessary to zero timer meter), and press TIMER START pushbutton. NOTES 1. Do not press TIMER RESET pushbutton while timer Is operating. 2. Timer meter will operate for five pulse intervals and then stop. A pulse interval is equal to 1/5 of the time indicated by the timer meter.	Same as step 25	Photo system assembly.
65	*Photo control panel* as Set POWER switch OFF. b. Set SYS PWR switch to OFF.		
66	*LS-89A* Set POWER switch to OFF	All indicators so off.	

2-10. KS113A Preflight Operational Check

Make sure the procedures given in paragraph 2-8 are performed prior to performing the operational check.

Refer to TM 11-6720-250-12 for the KS113A preflight operational check.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-11. Operation in Arctic Areas

Low temperatures have little effect on the camera system test equipment. The camera system test equipment will operate at temperatures as low as 40° F (35° C), and may be stored in temperatures as low as 85° F (65° C).

a. If the equipment is to be operated at low temperatures, keep it in low temperature storage when not in use. Store the equipment in the carrying cases and cover the cases with water-repellent material. If possible, store the carrying cases at the temperature in which the equipment will be used. When the equipment is to be operated in a temperature higher than 30° F (16° C) above the storage temperature, proceed as follows:

(1) Transfer the equipment from the cold to the warm location and allow it to remain in the carrying cases, covered with water-repellent material, for 6 hours.

(2) Before operating the equipment, use a lint free cloth to remove any condensation from the outer surfaces.

b. When the equipment is to be operated at freezing temperatures, follow the procedure below.

(1) Keep the equipment in low temperature storage when not in use.

(2) Do not breathe directly on the equipment during cold weather operation.

2-12. Operation in Tropical and Desert Areas

When the camera system test equipment is used in extreme heat and humidity, such as desert

and tropical regions, observe the following precautions:

a. Desert Regions. In desert regions, clean the equipment (para 3-7) before each use. Store the equipment in the carrying cases when not in use.

b. Tropical Regions. In climates of high humidity, such as the tropics, inspect the equipment daily for fungus, mold, insects, and metallic corrosion. Remove all fouling immediately (para 3-7). The equipment is moistureproofed and fungi-proofed. Store the equipment, when not in use, in the carrying cases with the original number of activated desiccant units and a humidity indicator.

2-13. Operation in Maritime or Rainy Areas

To prevent corrosion from salt-laden air and from rust caused by condensation when the equipment is stored, wipe all exposed metal surfaces with a soft, clean, lint free cloth moistened with Lubricating Oil, General Purpose, FED VV-L-800 (FSN 9150-273-2389). Store the equipment, when not in use, as directed in paragraph 4-1.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

3-1. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the system analyzer are listed below with references to the paragraphs for the particular maintenance function. Primarily, the duties are limited to visual inspection, cleaning, and replacement of fuses.

a. Daily preventive maintenance checks and services (para 3-4).
b. Weekly preventive maintenance checks and services (para 3-4).
c. Cleaning (para 3-5).
d. Visual inspection (para 3-6).
e. Fuse replacement (para 3-7).

3-2. Materials Required for Operator's Maintenance

a. Trichloroethane (cleaning compound).
b. Lint free cloth (FSN 8305-170-5062).
c. Camel's-hair brush (FSN 8020-242-9625).
d. Sandpaper, fine.
e. Fungus removal solution (mixture of Isopropyl alcohol 65%o and Freon 35%) (FSN 6850-133-0695).

3-3. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to prevent downtime, and to insure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraph 3-4 through 3-7 cover routine systematic care and cleaning essential to the proper upkeep and operation of the system analyzer.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services (tables 3-1 and 3-2) outline functions to be performed at specific intervals. These checks and services are to maintain Army photographic equipment in a combat serviceable condition; that is, in good general (physical) and good operating condition. If the defect cannot be corrected by the operator, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements of TM 38750.

c. Preventive Maintenance Checks and Services Periods. Preventive maintenance checks and services on the system analyzer are required daily and weekly. Table 3-1 specifies the checks and services that must be accomplished daily. The first column lists the interval and sequence that a particular check or service is required. This column is subdivided into three columns: B (Before Operation), D (During Operation), and A (After Operation). The second column lists the item to be inspected and the procedure. The third column (Work Time (M/H)) lists the manhours it should take the operator to perform the check or service. This time is expressed in tenths of hours. Table 3-2 specifies the checks and services that must be accomplished weekly.

3-4. Operator's Preventive Maintenance Checks and Services

a. Daily. Perform the preventive maintenance checks and services listed in table 3-1. If the equipment is not used daily, make sure these checks and services are performed prior to use.

b. Weekly. Perform the preventive maintenance checks and services listed in table 3-2. Equipment in limited storage (requires service before operation) does not require weekly maintenance.

Table 3-1. Operator/Crew Preventive Checks and Services-Continued

B-Before Operation Time Required:0.3			*D-During Operation* Time Required:0.3	*A-After Operation* Time Required: 0.1
Interval and sequence No.			Item to be Inspected	Work Time
B	D	A		(M/H)
			Note. Perform the following checks and services daily only if the equipment is used daily. If the equipment is not used daily, perform these checks and services only when used. Do not allow the equipment to go beyond 1 week without performing both the daily and weekly preventive maintenance checks and services.	
1	--	--	EXPOSED SURFACES OF CASES AND ATTACHING HARDWARE Clean dirt and moisture from exposed surfaces of combination case, test panel, tools, interconnecting plugs and cables (para 3-5).	0.2
2	--	--	EXTERIOR ITEMS (KNOBS, SWITCHES, CONNECTORS, AND INDICATORS) Visually inspect exterior items for damage Inspect each control and switch for tightness Replace setscrews that require frequent tightening (para 3-6).	0.05
3	--	--	TEST PANEL CONTROLS Inspect each control on the test panel for binding or scraping Tap controls lightly for cut-out due to loose contacts See that the action is positive without binding or scraping.	0.05
	4	--	OPERATION Perform the equipment preliminary procedures given in paragraph 2-8 Be alert for any unusual performance or conditions.	0.3
		5	COMPLETENESS Check that all components and accessories are stowed in their compartments after use Check all items against those listed in paragraph 1-8.	0.1

Table 3-2. Operator/Crew Preventive Maintenance Checks and Services

W-Weekly
Time required: 0.6

Sequence No.	Item to be inspected procedure	Work Time (M/H)
1	TEST SET CABLES AND WIRING Visually inspect the cables and the internal wiring for breaks, cuts, kinks, deterioration, strain, or fraying.	0.05
2	FUSES AND CONNECTORS Inspect fuses. Replace fuses in the spare fuse holders. See that only fuses of proper value are used. Check test set connectors for snug fit and contact.	0.05
3	INDICATOR ASSEMBLIES Check that each indicator assembly is operating properly by performing the preliminary operating procedures given in paragraph 2-8.	0.3
4	EXPOSED METAL SURFACES Inspect metal surfaces for signs of rust and corrosion. Clean dirt and moisture from exposed metal surfaces (para 3-5).	0.2

3-5. Cleaning

a. Brush dirt and dust from the exterior surfaces of the test panel with a camel's-hair brush and a clean, lint free cloth.

b. If any mildew or fungus is present, moisten a clean, lint free cloth in the fungus removal solution (para 3-2e) and rub the area. Dry the area with a dry, clean, lint free cloth.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT use near an open flame. Trichloroethane is not flammable, but exposure of the fumes to an open flame converts the fumes to highly toxic, dangerous gases.

c. Remove grease, and ground-in dirt from the

carrying case and components; use a cloth dampened (not wet) with trichloroethane.

d. Remove dust or dirt from plugs and jacks with a brush.

e. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

3-6. Operator's Visual Inspection

a. When the test panel fails to perform properly, turn off the power and check the items listed below.

WARNING

Do not check any items with power on.

(1) Wrong settings of switches or controls.

(2) Cables that are disconnected or poorly connected.

(3) Defective fuses.

b. If the above checks do not locate the trouble, refer the equipment to higher category maintenance.

3-7. Fuse Replacement

CAUTION

Use fuses of the specified rating. Use of fuses of a higher rating may result in damage to the equipment.

Operating fuses are located on the test panel (fig. 2-2) for the ac and dc power circuits. Spare fuses are in the fuse holders marked SPARE. If spare fuses are used, replace them as soon as possible. Replace a defective fuse as follows:

a. Press and turn the fuse holder cap counterclockwise and pull it out of the holder.

b. Remove the defective fuse and replace it with a new one.

c. Press the fuse holder cap on the fuse holder and turn it clockwise until it is properly seated.

Section II. ORGANIZATIONAL MAINTENANCE

3-8. Scope of Organizational Maintenance

Organizational maintenance of the system analyzer consists of the following:

a. Organizational preventive maintenance (para 3-10).

b. Troubleshooting (para 3-13).

c. Replacement of indicator lamps (para 3-14).

3-9. Tools, Materials, and Test Equipment Required for Organizational Maintenance

The tools, materials, and test equipment required for organizational maintenance of the system analyzer are as follows:

a. Tools. Tool Kit, Photographic Repair TK-77/GF is required for organizational maintenance of the system analyzer.

b. Materials. The materials required for organizational maintenance are the same as that for operator's maintenance (para 3-2).

c. Test Equipment. The only test equipment required is Multimeter AN/URM-105.

3-10. Organizational Preventive Maintenance

Preventive maintenance checks at the organizational maintenance level are made monthly and quarterly unless directed otherwise by the commanding officer. Table 3-3 specifies the monthly preventive maintenance checks and services. Table 3-4 specifies the quarterly preventive maintenance checks and services. Additional preventive maintenance information will be found in paragraph 3-4.

Table 3-3. Organizational Preventive Maintenance Checks and Services

M-Monthly
Time required: 0.5

Sequence number	Item to be Inspected Procedure	Work time (M/H)
1	PRESS TO TEST LAMPS AND FUSES Check lamps and indicator assemblies are operating properly by performing the equipment preliminary procedures given in paragraph 2-8. Replace lamps not functioning properly (para 3-14).	0.3
2	FUSES Inspect fuses on the test panel. Check to see that fuses are present in the spare fuse holders. Replace bad fuses (para 3-7).	0.05
3	SHOCK MOUNTS Inspect shock mounts for cleanliness and tightness	0.05
4	CONNECTORS Inspect connectors for damage such as bent pins and dented or deformed casing	0.1

3-11. Quarterly Preventive Maintenance

Quarterly preventive maintenance checks and services on the equipment are required. Periodic daily (table 3-1), weekly (table 3-2), and monthly (table 3-3) checks and services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38-750.

Table 3-4. Organizational Preventive Maintenance Checks and Services

Q-Quarterly
Time required: 1.9

Sequence number	Item to be Inspected Procedure	Work time (M/H)
1	INTERIOR OF CHASSIS AND COMBINATION CASE Clean interior of chassis and combination case (para 3-5)	0.2
2	PLUCKOUT ITEMS Inspect seating of readily accessible items of a pluckout nature; connectors, lamps, plug-in relays, etc. Do not twist to inspect. Use only direct pressure to insure item is fully seated.	0.1
3	RESISTORS AND CAPACITORS Inspect resistors and capacitors for cracks, blistering, or other obvious defects	0.1
4	DIODES AND TRANSISTORS Inspect diodes and transistors for loose connections and other obvious defects	0.1
5	SWITCHES AND CONTROLS Inspect switches and controls for smooth operation and alignment of position	0.1
6	PRESERVATION Check all surfaces for evidence of fungus. Remove rust and corrosion and touchup-paint bare spots (paras 3-5 and 3-12).	0.2
7	CABLES Check cables for continuity (para 3-15)	0.5
8	SCANNER EXCITER AND LIGHT SOURCE Check operation of scanner exciter and light source by performing the procedures given in paragraph 2-8 and the applicable portion or paragraph 2-9.	0.2
9	PUBLICATIONS Check DA Pam 310-4 to see that all publications are current, complete, and serviceable.	0.2
10	MODIFICATIONS Check DA Pam 310-7 to determine if new applicable MWO's have been published All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	0.2

3-12. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

3-13. Troubleshooting

Troubleshooting the system analyzer is based on actual operation of the equipment when used to check an ACCS. When an abnormal condition or result is observed, look for the symptom in the *Trouble symptom* column of the troubleshooting chart (table 3-5). Perform the checks and corrective measures specified in the troubleshooting chart. If the corrective measures indicated do not result in correction of the trouble, refer to a higher category of maintenance.

Table 3-5. Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and Corrective measure
		TEST PANEL	
1	Test panel does not function	Open conductor in cable	Perform continuity check (para 3-15).
2	Ac and dc fuse holder lamps	a. Defective ac fuse F2 or ac indicator light.	a. Replace fuse F2 (para 3-7). or cater lamp. lamp (para 3-14).
		b. Defective dc fuse F1 or dc indicator lamp.	b. Replace fuse Fl (para 3-7). or lamp (para 3-14).
3	Ac and/or dc fuse holder lamps do not light and TEST CONDITIONS meter reading is in GO area for MASTER SELECTOR switch positions of 28 VDC, PHASE A, and PHASE B.	Defective ac and/or dc fuse holder lamps.	Replace defective ac and/or dc fuse holder lamps (para 3-14a).
4	Any PRESS TO TEST indicators that do not light.	Defective indicator lamps	Replace defective lamp(s) (para 3-14b).
		SCANNER EXCITER	
5	Scanner exciter lamps do not light.	Defective lamps	Refer to a higher category of maintenance.
6	Scanner exciter lamps do not flash alternately.	Defective lamps or circuit malfunction In scanner exciter or test panel.	Refer to a higher category of maintenance.
		LIGHT SOURCE	
7	Light source lamp does not light.	Defective lamp	Refer to a higher category of maintenance.

3-14. Replacement of Indicator Lamps

a. Replacement of Fuel older Indicator Lamps (fig. 22). The fuse holder indicator lamp is contained in the fuse holder cap. If the lamp is defective, replace the entire fuse holder cap.

(1) Press and turn fuse holder cap counter clockwise and pull it out of the holder.

(2) Be sure that a good fuse is in place in the new fuse holder cap.

(3) ress the new fuse holder cap on the fuse holder and turn clockwise until it is properly seated.

b. Replacement of PRESS TO TEST indicator Lamps (fig. 22).

(1)Turn the knurled cap of the indicator counterclockwise and remove it from the test panel.

(2) Pull the defective indicator lamp out of the holder by grasping it at the base and pulling it from the holder.

(3) Insert a new lamp in the holder.

(4) Screw the knurled cap clockwise into the test panel until it is firmly seated.

3-15. Sectionalizing Troubles to System Analyzer Cables

Defective system analyzer cables will be indicated when it is apparent that power is not being applied to the test panel or when it is apparent that signals and voltages are not being interconnected between the system analyzer and the ACCS. Check the continuity of the suspected defective cable with Multimeter AN/URM-105.

Figures 3-1 through 3-4 are wiring diagrams of the system analyzer cables and should be used as a guide when checking continuity. If an open circuit is indicated during continuity checking, the wiring is defective.

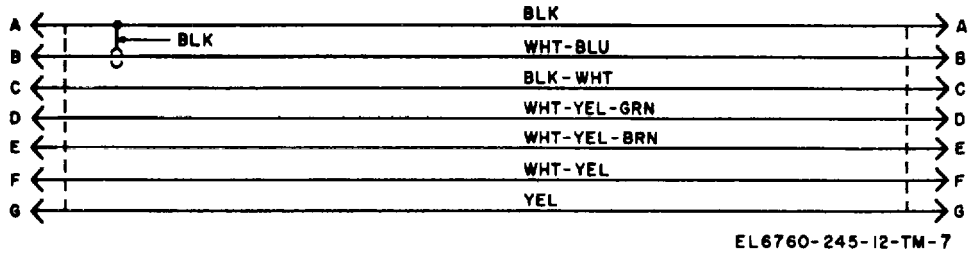

Figure 3-1. Cable 2996-306 (A1 W1), wiring diagram.

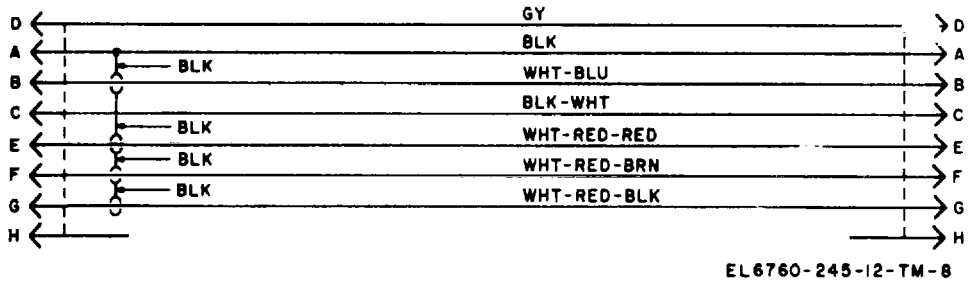

Figure 3-2. Cable 2996-307 (AIW2), wiring diagram.

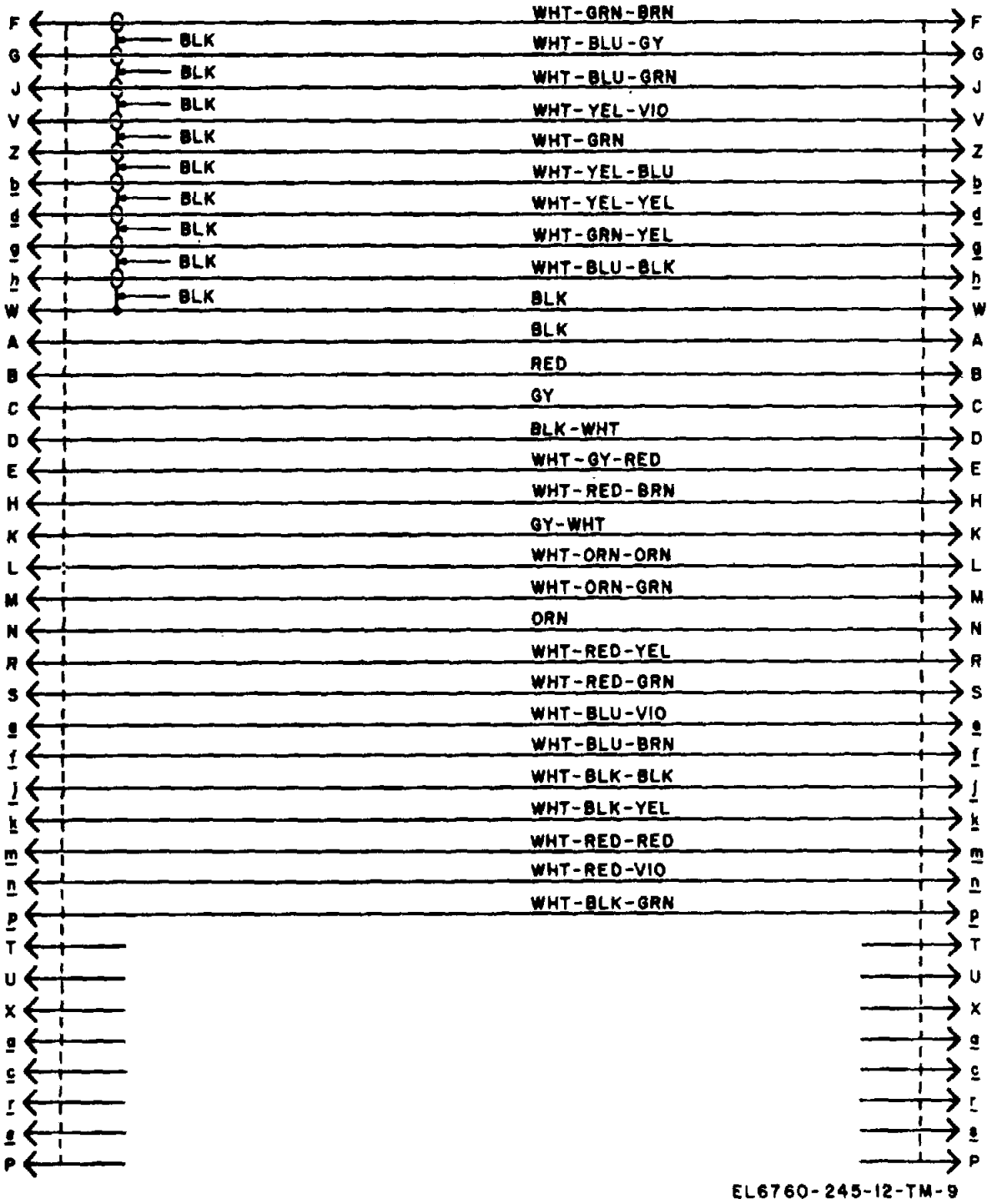

Figure 3-3. Cable 2996-409 (A1W4), wiring diagram.

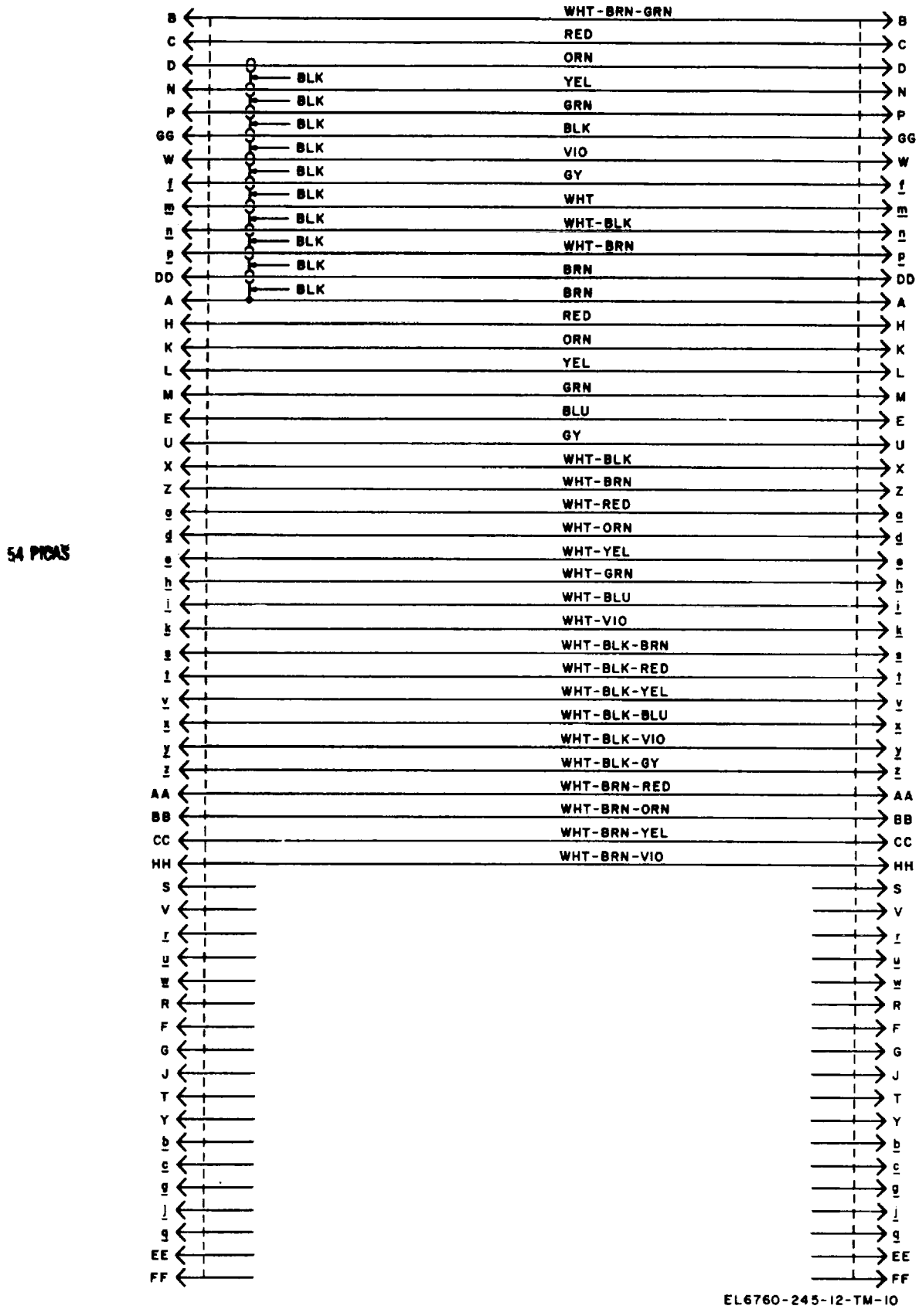

Figure 3-4. Cable 8097-117 (AIW3), wiring diagram,

CHAPTER 4
SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4-1. Disassembly of Equipment

Prepare the system analyzer for shipment or storage as follows:

a. Disconnect all cables from the system analyzer.

b. Place cables and accessories in the storage compartments in the combination case top.

c. Close and secure the hinged door.

d. Inclose the instruction manuals in an envelope of waterproof paper and seal it with water-proof tape.

e. Place the packaged instruction manuals in the pocket on the hinged door.

f. Place the required number of actuated desiccant units in the case with an activated humidity indicator.

g. Turn the air relief valve clockwise and secure it with a lock wire.

h. Install the combination case top on the bottom by engaging the separable hinges. Close the combination case and secure the snap latches.

4-2. Repacking for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. The information concerning the original pack aging in paragraph 21will also be helpful.

a. Material Requirements. The following materials are required for packaging the system analyzer. For stock numbers of the materials, consult SB 38-100.

Material	*Quantity*
Waterproof type	13 feet
Corrugated cardboard carton	8.0 cubic feet
Gummed tape	As required
Shock pads	8

b. Packaging and Packing.

(1) Check to be sure the procedures in paragraph 4-1 have been performed.

(2) Cushion all surfaces of the system analyzer with rubberized horsehair pads.

(3) Wrap the cushioned system analyzer with waterproof paper and seal with waterproof tape.

(4) Place the wrapped system analyzer in the corrugated cardboard carton. Close and seal the flaps of the corrugated cardboard carton and seal with gummed tape.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

4-3. Authority for Demolition

Use the demolition procedures given in paragraph 4-4 to prevent the enemy from using or salvaging this equipment. Demolition of the system analyzer will be accomplished only upon the order of the commander.

4-4. Methods of Destruction

Any or all the methods of destruction given below may be used. The time available will be the major determining factor for the methods to be used in most instances when destruction of equipment is undertaken. The tactical situation also will determine how the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than partially destroy all the equipment.

a. Smash. Smash the equipment.

(1) Use the heaviest tool on hand to smash the knobs, switches, and indicators.

(2) Remove the test panel from the combination case and, with a heavy hammer or bar, smash the exposed parts of the chassis and test panel face.

b. Cut. Cut cables, cords, and wiring in a number of places.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. Burn. Burn the instruction manuals first. Burn as much of the equipment as is flammable. Use incendiary grenades to complete the destruction of the equipment.

d. Explode. Use explosives to complete demolition or to cause maximum damage when time does not permit complete demolition by other means.

e. Dispose. Bury or scatter destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

APPENDIX A
REFERENCES

The following publications contain information applicable to the operation and organizational maintenance of Analyzer Set, Photographic Surveillance System LS-89A.

DA Pam 810-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Index of Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 11-1510-204-20-2/1	Organization Maintenance Manual: Signal Electronic Equipment Configuration, Army Model OV-1D Aircraft.
TM 11-6625-208-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105, Including Multimeter ME-77/U.
TM 11-6720-236-12	Operator and Organizational Maintenance Manual: Camera, Still Picture KA-76A and Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, and LA372A.
TM 11-6720-236-35	DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists Camera, Still Picture KA-76A and Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, and LA-372A.
TM 11-6720-250-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List: Photographic Surveillance System, Airborne KS 113A.
TM 38750	The Army Maintenance Management System (TAMMS).
TM 55-1510-204-10/5	Operator's Manual: OV-1D Aircraft.
TM 740-90-1	Administrative Storage of Equipment.

APPENDIX B
MAINTENANE ALLOCATION

Section I INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for LS-89A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance. services (inspect, test, service, adjust, align, calibrate, replace; or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

B-3. Column Entries

a. Column 1, Group Number. Column I lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. *Column 3, Maintenance Functions.* Column 3 lists the functions to be performed on the item listed in Column 2 When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3 This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time"

figure represents the average time required to re- store an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
0 - Organizational
F - Direct Support
H - General Support
D- Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Sect. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5digit) in parentheses.

B-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

SECTION II MAINTENANCE ALLUCATION CHART
FOR
ANALYZER SET, PHOTOGRAPHIC SURVALIANCE SYSTEM LS-89A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENENCE FUNCTION	(4) MAINTENANCE. CATEGORY C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
00	ANALYZE SET, PHOTOGRAPHIC SURVALIANCE LS-89A	Impact	0.3						A
		Service	0.2						
		Test		0.3				1	B
		Service		0.3				2	C
		Repair		0.4				2	
		Test			1.0			4	D
		Test				1.0		4,8	D
		Overhaul					16.0		E
01	ANALYZER, PHOTOGRAPHIC SURVALIANCE SYSTEM LM-202A	Service		0.2					
		Test		0.3				1	F
		Repair		0.3				2	
		Replace			0.5			2	
		Test			0.5			2thru5	
		Adjust			0.5			2thru5	G
		Repair			0.8			2, 3	H
		Tent				0.8		4, 5, 7, 8	
		Repair				1.0		2, 3, 6	I
0101	BRACKET ADDEMBLY A1A1A1	Repair				1.0		2, 3, 6	I
		Test				1.0		4, 9	
010101	CIRCUIT CARD ASSEMBLY A1A1A1A1	Replace				0.8		2, 3, 6	
		Test				0.5		4, 9	
		Repair				1.5		2, 3.6	J
0102	BRACKEIT AND COMPONENT ASSEMBLY A1A1A6	Test				0.5			
		Repair				0.8		2, 3, 6	I
010201	BRACKET AND MOTOR ASSEMBLY	Replace				0.5		2, 3, 6	
		Test				0.5		4., 9	
		Repair				0.8		2, 3, 6	K
02	CASE, ANALYZER LM-201A A1MP1	Replace		0.5					
		Repair					1.0	2, 3, 6	
03	EXCITER, SCANNER LM-113A A1A2	Replace		0.2					
		Service		0.3					
		Test			0.5			4	
		Repair		0.1				2	
		Repair			0.8			2, 3, 6	L
		Repair				1.5		2thru9	
		Repair					3.0	2thru9	
04	SIMIULATOR, FLASH BURST LM-111A A1A3	Replace		0.2					
		Service		0.3					
		Test			0.5			4	
		Repair		0.1				2	
		Repair			0.8			2, 3, 6	M
		Repair				1.5		2thru6	
		Repair					3.0	2thru6	
05	ADAPTER SCANNER EXCITER L-200A A1A4	Replace		0.2					
		Repair		0.2				2	N
		Repair				0.5		2thru9	
06	ADAPTER, FLASH LM1-99A A1A5	Replace		0.2					
		Repair		0.2				2	N
		Repair				0.5		2thru9	
		Repair					1.0	2thru9	
07	CABLE ASSEMBLY, SEPCIAL PURPOSE LM-115A A1W1	Test		0.3				1	
		Replace		0.2					
		Repair			0.6			2, 3, 6	I
08	CABLE ASSEMBLY, SPECIAL PURPOSE LM-114A A1W2	Test		0.3				1	
		Replace		0.2					
		Repair			0.6			2, 3, 6	I
09	CABLE ASSEMLY, SPECIAL PURRPOSE LM-198A	Test		0.3				1	
		Replace		0.2					
		Repair			0.6			2, 3, 6	I
10	CABLE ASSEMBLY, SPECIAL PURPOSE (2996-309)	Test		0.3				1	
		Replace		0.2					
		Repair			0.6			2, 3, 6	I

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR ANALYZER SET, PHOTOGRAPHIC SURVALIANCE SYSTEM LS-89A

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	0	MULTIMETER AN/URM-105	6625-00-581-2036	
2	O,F,H,D	TOOL KIT, PHOTOGRAPHIC REPAIR TK-77/GF	5180-00-752-9068	
3	F,H,D	TOOL KIT, PHOTOGRAPHIC REAPIR TK-109/GF	5180-00-856-9653	
4	F,H,D	MULTIMETER TS-352B/U	6625-00-242-5023	
5	F,H,D	POWER SUPPLY PP-3940/G	6130-00-953-7500	
6	H,D	TOOL KIT, RADIO AND RADAR REPAIR TK-87/U	5180-00-960-4452	
7	H,D	METER, FOOT CANDLE, PHOTOELECTRIC ME-86/U	6695-00-641-5083	
8	H,D	RESISTANCE BRIDGE ZM-4/U	6625-00-166-0398	
9	H,D	TEST SET, SEMICONDUCTOR DEVICE TS-1836C/U	6625-00-159-2263	

SECTION IV. REMARKS
LS-89A

REFERENCE CODE	REMARKS
A	Initial and preoperational.
B	Troubleshooting.
C	Preventive maintenance.
D	Troubleshooting, system test.
E	Refer to DMWR.
F	Fuses, continuity.
G	Variable resistors.
H	Replace fuse holders, meter, switches, lamps, resistors (R20, R35).
I	Replace all parts.
J	Replace all components.
K	Replace motor and all parts.
L	Replace photocell, cover, window, sockets, cover.
M	Replace photocell, screen, window, fan, screws and nuts, cover.
N	Replace suctions cups.

APPENDIX C

ORGANIZATIONAL REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists repair parts (sec. II) required for the performance of organizational maintenance of the LS-89A.

NOTE

No special tools, special test, and support equipment are required.

C-2. Repair Parts for Organizational Maintenance

Repair parts authorized for organizational maintenance are included in section II.

C-3. Explanation of Columns

The following provides an explanation of columns in the tabular lists:

a. Source, Maintenance, and Recoverability Codes (SMR), Column 1.

(1) Source codes indicate the selection status and source for the listed item. Source codes are :

Code — *Explanation*

P- Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.

P2- Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.

P9- Assigned to items which are NSA design controlled: unique repair parts, special tools, test, measuring and diagnostic equipment, which are stocked and supplied by the Army COMSEC logistic system, and which are not subject to the provisions of AR 380-41.

P10- Assigned to items which are NSA design controlled: special tools, test, measuring and diagnostic equipment for COMSEC support, which are accountable under the provisions of AR 380-41, and which are stocked and supplied by the Army COMSEC logistic system.

M- Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.

A- Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.

X- Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.

X1- Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component.

X2- Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.

G- Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DS and GS level or returned to depot supply level.

(2) Maintenance codes indicate the lowest category of maintenance authorized to install the listed item. The maintenance level codes are-

Code	Explanation
C	Operator/crew
O	Organizational maintenance

(3) Recoverability codes indicate whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R-	Repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
S-	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T-	High-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.
U-	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high-dollar value reusable casings or castings.

b. Federal Stock Number, Column 2. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses.

d. Unit of Measure (or Unit of Issue), Column 4. A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit, Column 5. This column indicates the quantity of the item used in the LS-89A.

f. 15-Day Organizational Maintenance Allowance. Items authorized for requisition as required are identified by an asterisk in the allowance column.

g. Illustrations.

(1) *Figure number.* Indicates the figure number in which the item is shown.

(2) *Item number or reference designation.* Not applicable.

C-4. Federal Supply Codes for Manufacturers

Code	*Manufacturer*
11871	Bourns/Cai Co.
49956	Raytheon Co.
96906	Military Standards

[Next page is C-5]

SECTION II. REPAIR PARTS FOR ORGANGATIONAL MAINTENANCE

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF NUMBER & MFR CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW (a) 1-5	(b) 6-20	(c) 21-50	(d) 51-100	(7) ILLUS-TRATION (a) FIG. NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P- C- B	6760-484-3042	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL LM-198A: 8097-117 (11871)	EA	1	*	*	*	*	1-1	
P- C- R	6760-740-0697	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL LM-115A: 2996-306 (11871)	EA	1	*	*	*	*	1-1	
P- C- R	6760-740-0698	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL LM-114A: 2995-307 (11871)	EA	1	*	*	*	*	1-1	
P- C- R	6760-855-9292	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL LM-106A: 2996-309 (11871)	EA	1	*	*	*	*	1-1	
G- O- S	6760-457-0584	CASE, ANALYZER LM-201A: 2996-357-1 (11871)	EA	1					1-1	
G- C- S	6760-874-4556	EXCITER, SCANNER LM-113A: 2951-400 (11871)	EA						1-2	
G- C- B	6760-874-4553	SIMULATOR, FLASH BURST LM-113A: 2996-450-1 (11871)	EA						1-3	
G- 0- S	6760-463-4053	ANALYZER, PHOTOGRAPHIC SURVALIANCE SYSTEM LM- 202A	EA						1-1	
P- O	**5920-342-5828**	**F**USE, CARTRIDGE: MS590079-24 (96906)	EA	**2**	*	*	*	*	2-2	
P- O	5920-504-8634	FUSE, CAUTRIDGE: MS90078-20 (96906)	EA	2	*	*	*	*	2-2	
P- 0	5355-680-1357	KNOB (SCAN EXCITER): MS91528-ir28 (96906)	EA	1	*	*	*	*	2-2	
P- O	5355480-1357	KNOB (LIGHT LEVEL): MS91528-1728 (9696)	EA	1					2-2	
P- O	5355-616-9604	KNOB (TIMER): MS91528-IP28 (96906)	EA	1	*	*	*	*	2-2	
P- O	5355-616-9604	KNOB (FOCAL LENGTH): MS91528-1P28 (96906)	EA	1					2-2	
P- O	5355-226-8071	KNOB (MASTER SELECTOR): 70-2-20(49956)	EA	1	*	*	*	*	2-2	
P- O	6240-155-7836	LAMP, INCANDESCENT: MS25237-327 (990D6)	EA	16	*	*	*	*	2-2	

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W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
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